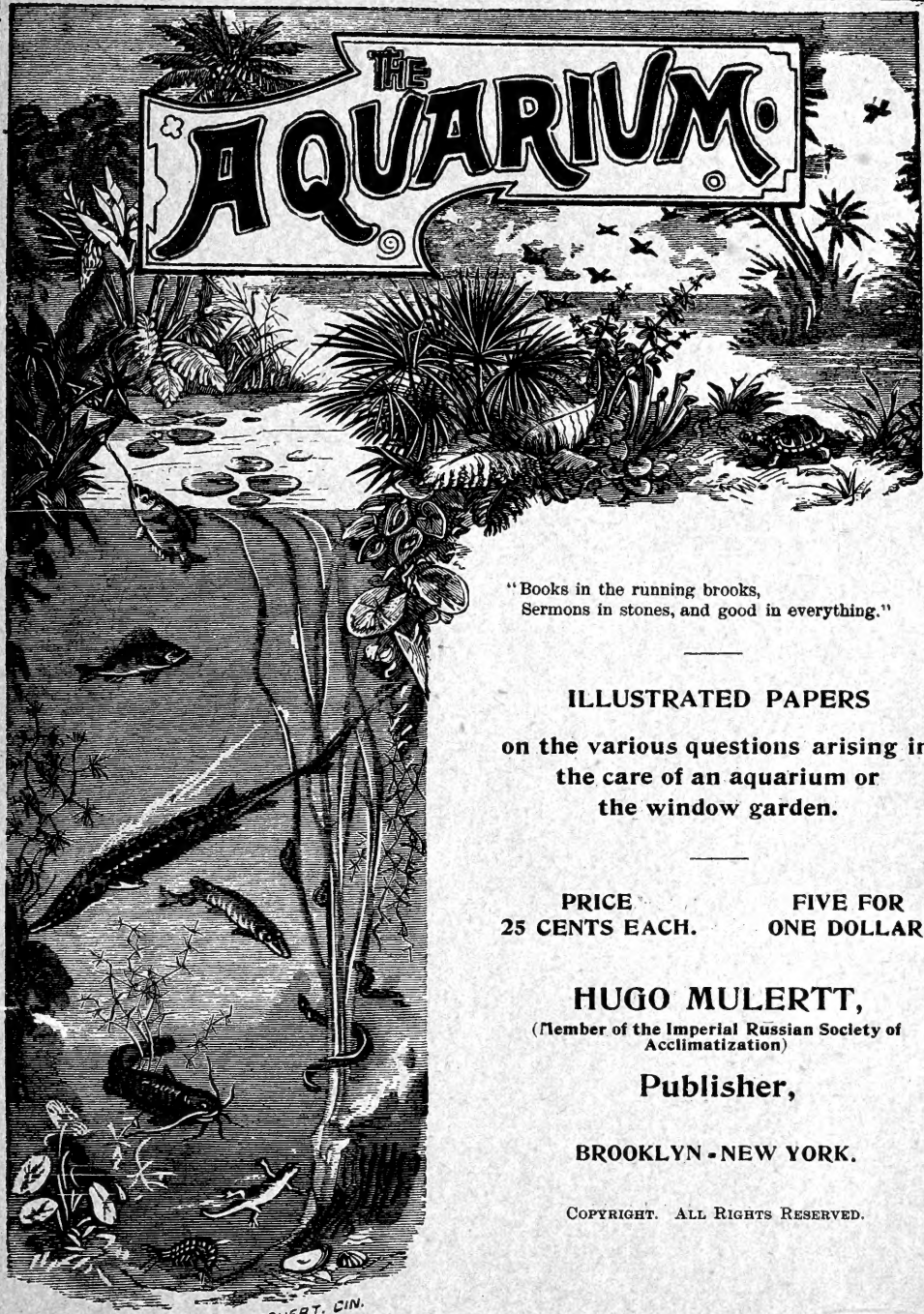


590.773  
240042  
DIVISION OF FISHES  
U. S. NATIONAL MUSEUM

*Fishes*

# THE AQUARIUM



"Books in the running brooks,  
Sermons in stones, and good in everything."

## ILLUSTRATED PAPERS

on the various questions arising in  
the care of an aquarium or  
the window garden.

PRICE  
25 CENTS EACH.

FIVE FOR  
ONE DOLLAR.

**HUGO MULERTT,**

(Member of the Imperial Russian Society of  
Acclimatization)

**Publisher,**

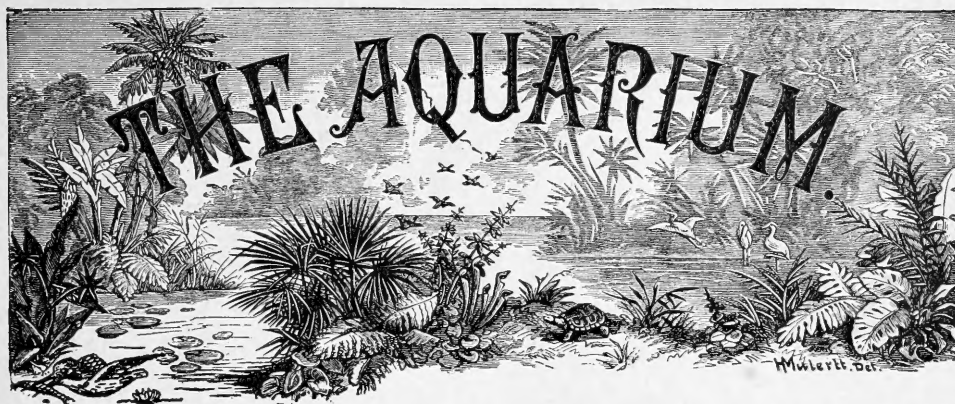
**BROOKLYN - NEW YORK.**

COPYRIGHT. ALL RIGHTS RESERVED.

ACHERT. CIN.

590.773





VOL. IV.

JANUARY, 1897.

No. 42.

COPYRIGHT 1897. ALL RIGHTS RESERVED.

### THE NEW YORK AQUARIUM OPENED.

On December 10, 1896, the doors of the New York Aquarium were opened and the public admitted to the lower or main floor of the building. The upper section, being not quite finished, remains closed for awhile yet. The opened section contains eighteen glass-front tanks for marine and as many for fresh-water specimens. The glass of these measures 4x5 feet in some and 4x7 feet in others. In some cases the partition wall of two adjoining tanks has been removed and thus the tanks have been made more spacious. Their depth from the glass to the rear wall is about four feet. The glass, imported plate, one inch thick, is set against elastic rubber with waterproof cement. The three inside walls are faced with white glazed tiles. The tanks proper are constructed of brick laid in Portland cement. A more detailed description, also of the working apparatus behind the scenery, we must postpone to some future day.

The tanks above mentioned are arranged in a circle around the main hall, the so-called Rotunda. In this spacious

portion of the building are seven basins. One larger, round one and six others of kidney shape. These basins are built in cistern fashion, partly below the floor level, of brick; they receive a constant supply of fresh seawater from the bay and are intended for such animals that are best seen from above or the size of which making it impracticable of being displayed in plate-glass tanks. The accompanying illustration, which we reproduce with permission of the *New York Morgen Journal*, is a very good representation of the interior.

The round basin, located in the centre of the main floor, has a capacity of 50,000 gallons of water. This is a larger body of water than was used in the entire aquarium display at the Columbian Exposition at Chicago.

On the opening day the management of the Aquarium was able to display one hundred and twenty-five different forms of animal life, of which seventy-eight were fish. This is a remarkably good showing, for it has to be considered that the winter is the worst possible season for the opening of such an institution.

In the fresh-water section nearly

every species of trout is already represented by good specimens. All the animals were in good condition; we noticed only a few specimens that were affected with fungus, but these being new arrivals, will, under proper treatment, soon recover.

The Aquarium proves already a great attraction to all classes. On the first Saturday, December 12th, between fif-



DR. TARLETON H. BEAN,  
SUPERINTENDENT OF THE N. Y. AQUARIUM.

teen and sixteen thousand people visited it during the six hours that it was open to them. Fifteen policemen were constantly busy to keep order. At about 3 P. M. of that day we estimated the crowd before the tanks to number four thousand people.

The Aquarium will be open to the public all the year round, from 10 A. M. till 4 P. M., six days in the week, including Sunday. Mondays it will be closed to the public, as it is necessary to have one day each week for the exclusive use of the management. The admission is free to everybody.

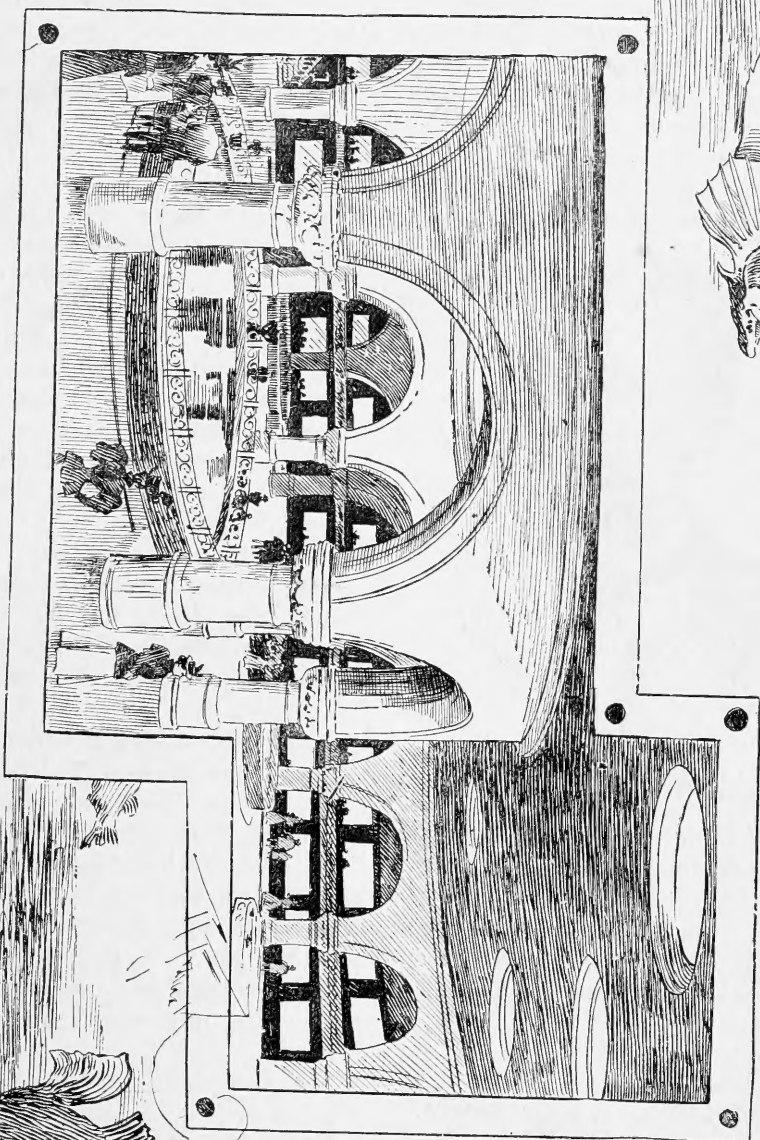
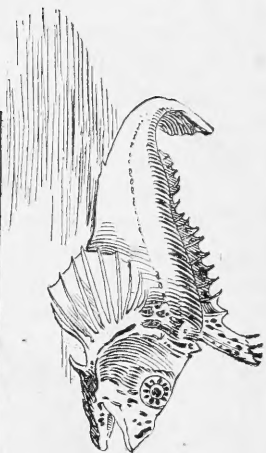
The running expenses of an institution of this kind, for which the city of

New York has expended nearly half a million of dollars, is quite considerable. There is the superintendent with two assistants, a bookkeeper, three engineers, several laborers, porters, doorkeepers, day and night watchmen and policemen. Besides the salaries for these there is the coal bill for the pumping engine and the heating of the huge building; the regular supply of food for the animals, and last, but not least, the losses caused by the death of specimens. In our estimation, the expenses for running the New York Aquarium will be somewhere between \$35,000 and \$50,000 per annum.

Now since the New York aquarium is opened before us, it will be interesting to our readers to learn something regarding its origin.

At our arrival in New York City from Cincinnati shortly before Christmas, 1888, one of the first parties we called upon was one of the Fish Commissioners of New York, with whom we had had dealings for years. The conversation drifted from our aquarium work in general to that of our fish display at the Cincinnati Centennial Exposition, from July 4th to November 10, 1888, of which reports had reached interested parties. At future meetings, at which aquarium talk formed the main topic, we arrived at the conclusion that the great metropolis lacked one great institution,—a public aquarium.

At this period the Columbian Exposition project was cultivated, and New York City expected to have the great "Fair" within its borders. In connection with the display of the Fisheries Industries it was planned that the Fish Commissioners of the various States and also that of the United States should make a grand display of



INTERIOR OF THE NEW YORK AQUARIUM. OPENED DEC. 10TH, 1896.



live fish from every section of this continent in an elaborate aquarium, which was to be built by the Exposition Commission at Central Park, where the great "Fair" was expected to be located. After the close of the fair, this aquarium was to remain as a memorial and was to be run on city or State expense for the benefit of the public.

As every one knows, the big fair was held in Chicago, and the opportunity of getting a fine aquarium for New York comparatively easy, was lost. Our friend of the Fish Commission now had a bill drawn up, providing for a public aquarium in the city of New York, and had it presented before the Legislature.

Shortly after this the new Governor came into office, and he appointed a new Board of Fish Commissioners. The Legislature passed the aquarium bill, making an appropriation to the amount of \$160,000 to begin the work. But instead of placing it under the control of the Fish Commission it was put in charge of the Board of Public Parks.

This Board, not favoring the idea of having the aquarium in Central Park, located it in the old Castle Garden, which, being part of Battery Park, was under their control. This ancient structure was not used for anything at the time, the emigrant depot having been transferred to Ellis Island.

Here the plans of inexperienced hands were carried out, and when the aquarium was to be opened, about two years ago, it was found that it had been built solely on theory and that a big part had to be reconstructed and changed in order to fit it for a practical purpose. This accounts for the large sum of money spent in its construction and the space of time used until completed.

The new Superintendent, under whose direction the aquarium was changed to its present state, will, in time, bring this institution to a respected standing, if not in line with the best aquariums in Europe.

### FRESH WATER FISH IN SALT WATER.

It is well known that fresh water fish cannot live in salt water, and *vice versa*, and it has been supposed that the reason existed in some poisonous effect which the inappropriate water exerted. M. Paul Bert has investigated this subject, and his conclusion is that the death of the creature is not due to any toxic action, but is simply a phenomenon of osmosis or transmission of fluids through the membranes. In order to prove this it is only necessary to weigh the animal before and after the experiment. A frog, for example, plunged into sea water loses one third of its weight. If only the foot of the frog be introduced the blood globules can be seen to leave the vessels and distribute themselves under the skin. If an animal be taken, the skin of which is not entirely osmotic, the same phenomena occurs in the bronchial system.

There are certain fish, however, which exist sometimes in salt, sometimes in fresh water, changing their habitation in different periods of life or of the year. It, therefore, in view of the above, becomes interesting to see how M. Bert applies his discovery to such apparent exceptions to the general rule. A fresh water salmon, for instance, plunged abruptly in sea water, resists the effects longer than other fresh water fishes; but he dies within five or six hours. This shows, according to M. Bert, that the fish never proceed suddenly from fresh to salt water, but en-

ter brackish water, where the tide ebbs and flows, and live there a sufficient time to habituate themselves to the change. This accounts for the frequent discovery of large numbers of such migratory fish in the vicinity of the mouths of the rivers which they ascend.

A fresh water eel, plunged in salt water, does not seem to be affected. But in investigating the peculiarities of this species, M. Bert was led into a wrong conclusion, which may be cited to show how easy it is, often by pure accident, to reach an erroneous determination in laboratory experimenting. After having himself placed several fresh water eels in salt water, he found, as already stated, that they remained alive and unharmed. Wishing to continue the experiments, he directed his assistant to introduce the fish and report results. To his surprise, the eels then persistently died after a three or four hours' sojourn in salt water, and long search failed to discover the reason why it was that, when M. Bert placed them in the tanks they lived, while when his assistant did so, they perished. Finally M. Bert found that his assistant, doubtless on account of the slipperiness of the eels, lifted them with a piece of cloth in his hand. The cloth rubbed off a little of the natural slime of the animal, which protected them from salt water. Osmosis then occurred in the denuded portion, and the eel eventually died.

The converse experiment of inserting sea fish in fresh water, produced analogous results. The gills were the seat of alterations, the same as those noted in fresh water fish placed in salt water. M. Bert also observed that the life of the sea fish could be prolonged by adding salt to the fresh water, thus adding further confirmation to his theory.

#### "THE HEARING OF A FISH.

For an inquiry whether fishes have a sense of hearing, Herr A. Kreidt experimented upon goldfish—normal, fish poisoned with strychnine, and fish deprived of their labyrinths. Sounds were made by sonorous rods plunged in the aquarium, to which tuning forks or bows were applied out of the water. Whistling and the ringing of bells outside of the water produced no impression on either of the three classes experimented upon. But all responded whenever the apparatus within the aquarium was struck with the production of an audible sound. The conclusion was drawn that fish do not hear as in ordinary hearing with the ears, but that they are sensitive to sonorous waves which they can perceive through some skin-sense."

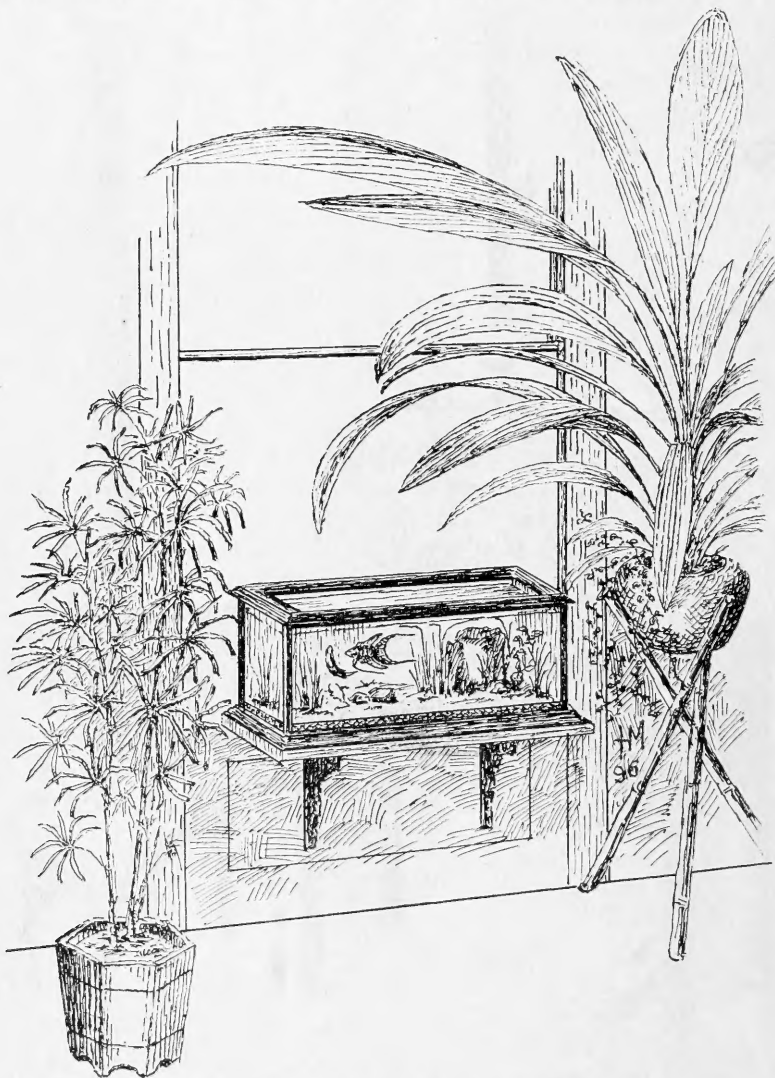
Respecting the above extract, I may state that after a period of over thirty years' observations on fish of almost all kinds, in my private aquarium, I long ago came to the conclusion that fish have no perceptible hearing, in the ordinary sense of that term. The loudest noises made in the room in which the aquarium stood, failed to excite them in any way. They would remain suspended in mid-aquarium, or swimming around without the slightest regard to the noises, or being in any way disturbed thereat. But the slightest shock to the stand on which the aquarium was placed, or the slamming of a door, or any motion by which the aquarium itself would be disturbed, had the effect of creating a fish panic. The conclusion I arrived at is that vibration acts on an aquarium's occupants in the same way as sudden noise acts on other animals, and that it is through the sense of shock or vibration

that they take fright, and not from any auscultatory sensation. I remember as a boy, watching a shoal of roach and dace in a fish-pond in England, when suddenly a vivid flash of lightning occurred. It had no visible effect on the fish, but as soon as the thunder came, which fairly made the earth vibrate, they one and all suddenly dived out of sight, not from hearing it, but from the vibration, for I had fired a

gun just previously at some water-fowl, without its having any effect on the fish. Perhaps some of our fish anatomists may be able to contribute their ideas on the point, and to account for the peculiar white stony substance that exists in the head of the haddock, which has been attributed to the ear of those fish.

H. B. SMALL.

Ottawa, Canada.



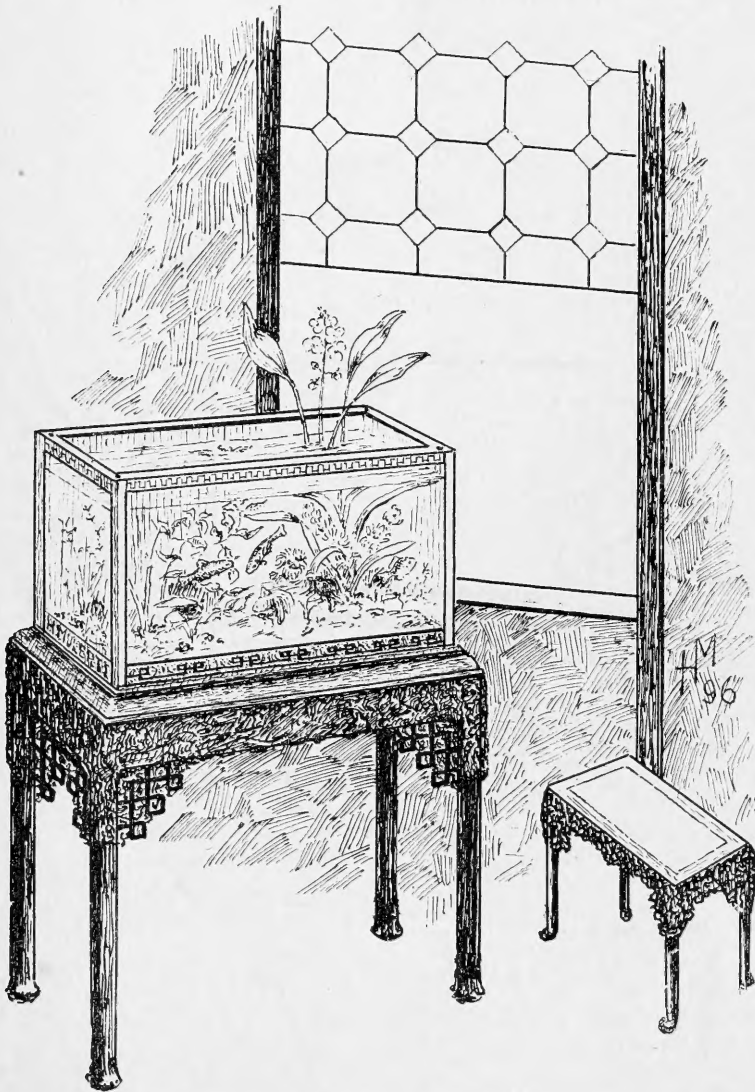
AQUARIUM IN A WINDOW, WITH AN EXPOSURE TO THE NORTH. THE ACCOMPANYING PLANTS ARE: *CURCULIGO RECURVATA* AT THE RIGHT, AND *RHAPIS FLABELLIFORMIS* AT THE LEFT OF THE PICTURE.

### THE PROPER POSITION FOR AN AQUARIUM.

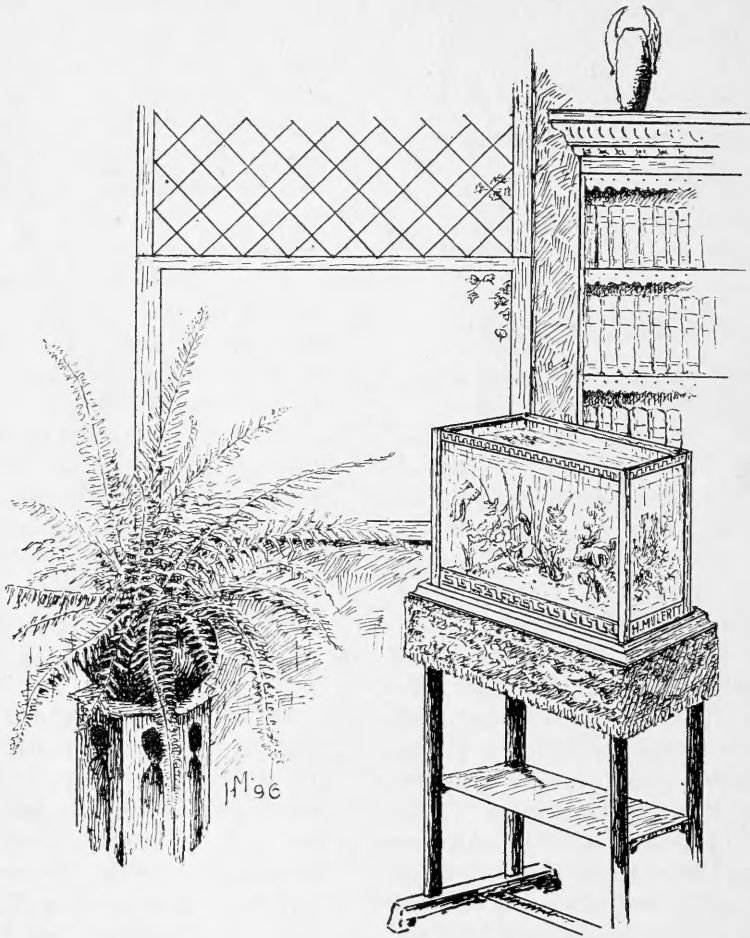
When establishing an aquarium for the instruction or recreation of the family circle, one of the principal questions to be considered is, in many cases, that of the expense connected with it. "We would like to have an aquarium at home very much, but we cannot

afford it." This expression we hear very frequently, and really there is no reason for it. An aquarium is as inexpensive an enjoyment as is a little flower bed in one's back-yard.

The main point one has to consider when about to start one, is the location, or still stronger expressed, the light, one is able to supply for it. The tem-



AQUARIUM NEAR A WINDOW, WITH AN EXPOSURE TO THE SOUTH OR WEST.



AQUARIUM NEAR A WINDOW, WITH AN EXPOSURE TO THE EAST. THE ACCOMPANYING PLANT IS *NEPHROLEPIS EXALTATA* (VAR. *BOSTONIENSIS*).

perature is of less importance as long as this is above the freezing point. The success of an aquarium depends upon the proper action of the aquatic plants, and these require, in order to act properly, their share of light and warmth to the same degree as ordinary house-plants do in order to flourish, and if one can supply these wants, the expense of keeping an aquarium in excellent order is very little indeed.

To secure success, an aquarium

should therefore be always near a window.

In the accompanying sketches we show the various positions that may be chosen for an aquarium. In each case it will be seen that justice is done to the plants in the aquarium as well as to the persons wishing to enjoy an hour or two of wholesome recreation.

Subscribe for *THE AQUARIUM* now.

# THE AQUARIUM.

A QUARTERLY MAGAZINE.

\$1.00 a Year. Single Copies, 25 cts. Each.

Advertising Rates on Application.

HUGO MULERTT, F. I. R. S. A.,

Editor and Publisher,

173 Nostrand Av., Brooklyn, N. Y.

## INSTRUCTIVE PASTIME.

When you are staying in the country, and missing the flag-stones of the city, confessing yourself "bored" with nothing to do, and feeling the want of balls, parties, theatres and operas, do as we shall herein bid you, and our word for it, all your ennui will be dispelled very quickly. Get a glass jar of some kind—a candy jar will do—a battery jar would be better—cover the bottom with clean river sand and pebbles, then go to the nearest pond, and get some of the plants that you will be almost certain to see growing there beneath the water, and place them in your jar, planting those that you find growing in the deep soil at the bottom of the pond, in the sand of your *aquarium*, leaving the others to float, and fill it up with water. Now return to your pond and search at the bottom, and on the under sides of the leaves of the aquatic plants, for the snails that you will be nearly certain to find in those positions, and when you have collected about a dozen, throw them into the water of your jar. When your aquarium is thus prepared for the reception of other live stock, take a small net, made by stretching a bag of mosquito-netting over a wire ring, and attach to a long handle, then proceed to your pond, plunge your net, and drag it for some few feet along the bottom; take all it contains, when you

draw it up, and after washing, place it in your jar along with any fish and tadpoles that you have been lucky enough to catch, or that you can persuade any of the country urchins, for a few cents, to procure for you; and then you will have an aquarium in full vigor.

Now, tell us, is an aquarium such a deeply scientific affair; and is it so very difficult to manufacture? We think that you will agree with us after one day spent in searching for objects, and the many hours you will be sure afterwards to spend in watching your happy prisoners, that you are not quite so much "bored" as you were, and that your walk in the fresh air has done you a great deal of good, and banished all wishes for a city life again.

## AN ALBINO FROG.

At the end of September a young student of the Packer Institute of this city told us of a curiously colored frog which she had caught a day or two before near her country home at Orient, Long Island. When the specimen was brought to us afterwards for identification, we recognized it at once as an albino leopard frog (*Rana halecina*).

The upper side of the body of the common leopard frog is green or brown in color, in both cases, with a brilliant bronze lustre; the two folds along its back are bronze colored, standing well out from their darker base; upon its back are dark, *round* spots arranged in two lines, while the upper parts of the hind legs are ornamented with dark bars.

The specimen in question is a fully developed male, about three years old. The color of all parts of its body, seen from above, is a brilliant cream; while

the underside of the specimen is pure white ; along its back and on the hind legs the markings, characteristic to the species, appear indistinctly also in cream color, just a trifle deeper in shade ; they can be made out by close inspection. The eyes are of a beautiful deep pink. Owing to the absence of dark colors in the skin, the animal has a very delicate appearance ; it looks as if it was carved of ivory.

We have seen albino deer, fox, squirrels, ferrets, cats, raven, eel, and years ago had an albino catfish (species *Amiurus marmoratus*) in our collection, not to mention the more frequent albino rabbits, rats and mice, but for nearly half a century during which we collected and handled large numbers of every known species of batrachians, we have never before seen an albino frog, nor have we read or heard that any one else ever has noticed such a freak in frogdom. It may, therefore, be safely said that this albino frog is the first one on record.

The specimen enjoys good health in one of the smaller aquariums of the Institute, where it is admired by the students at their leisure moments.

#### NELUMBium ALBUM GRANDIFLORUM.

It was our pleasure last season, as never before, to critically test the white Japanese Lotus, *Nelumbium Album Grandiflorum*, and we do not hesitate to say that it, in every particular, came up to, if not surpassed our expectation, both in freedom to bloom and impunity to stand rough treatment. It is truly one of the floral aristocrats, and whoever is so fortunate as to possess it, indeed has a treasure. We know of but one reason why it is not in general cul-

tivation, and that is its extreme scarcity in this country, which has kept it from being generally known.

This grand flower being the largest, most prolific, most elastic of different temperatures, and most chaste in color of all the lotuses, eminently deserves highest rank among them. Both stalk and foliage are stronger and more bulky than Egyptian Lotus, the flowers open out wider, the petals are broader and more rounded. The flowers rise but little above the leaves, and often open amidst or beneath them, a habit peculiar to the Japanese Lotus. The color of the petals is a clear, pearly white throughout, the outside of the outer ones being softened with cream at their bases. The texture is fine and uniform as in *Nelumbium Roseum*. The stamens are long, numerous and prominent ; color, bright sulphur yellow. The seed pod is of the same rich color, and displays well the beautiful waxy white pistils. The flowers are the largest of all the lotuses, are delightfully fragrant, and outstrips in magnificence the loveliness and splendor of a magnolia. It has proven perfectly hardy, in open ponds, anywhere in the United States and southern provinces of Canada. This is not a wild plant, having been under the highest state of cultivation by the Chinese and Japanese from time immemorial, it gives best results when cultivated.

If grown in tanks or tubs, where it becomes root-bound, the flowering quality is greatly enhanced. In open waters and large pools it blooms much more freely after becoming crowded. It is a heavy feeder, and delights in rich soil, plenty of fresh air and sunshine.

With us this is one of the most satisfactory of all the lotuses in the fish tank. No lotus furnishes any notice-

able amount of forage for fishes, but this one being a strong feeder, naturally adapted to growth in tanks, and a good oxygenator, may be introduced to advantage for shade, flowers and purifying the water in aquariums or tanks having a superficial area of fifteen feet or upwards, and kept in open sunshine.

This plant is a native of China and Japan, where it has ever been and now is, worshipped as the first flower of the land. Believing, as these people do, that the world emanated from the waters, the water lily is held as an emblem of the creation, because it springs from the waters, and their deities were thought to have no other passage from their elysian abode to and from the earth except through the medium of the water lily. Both Brahma and Buddha were said to have emanated from a lotus blossom and retired from the world through it. Hence, we can readily see why the lotus is esteemed the most sacred of plants. This one, being of pure white, was regarded as perfect—the god-parent—and when associated with mortals—pollution and sin—its face was stained by corruption, and in this way they account for the variegated and blotched varieties of the other lotuses.

These nations have ever been famous for their inventive genius, and to the artistic eye the lotus has been a prototype for most all their advancements in art, architecture and agriculture.

Fancy in its leaves a direct counterpart of the hat, the parasol, the fan, the plate, the drum, and a suggestive idea for silk and velvet. In its floating leaves—on which often mud is deposited and small plants growing—a floating garden in miniature—the lotus pond at night quickly suggests Chinese lanterns, while

the boat is modeled exactly after its petals. Is not a plant that has been revered, imitated and utilized, by all ages and nations, worthy of recognition from young America?

GEO. B. MOULDER.

Smith's Grove, Ky.

### HOUSE PLANTS.

An important point in the management of house plants, is to have a fertilizer which will act as a good manure, and at the same time will not be offensive in closed rooms. The following is recommended as an excellent compost, entirely unobjectionable when it has had time enough to fully ripen. Mix wood mould with one-third its bulk of cow manure, and work it over after the fermentation has become active; then cover it with straw and stir occasionally till it is reduced to a fine, evenly-grained compost. A good way also is to treat in a similar manner leaf mould mixed with guano, bone dust, hen manure, etc.

But other precautions are necessary, besides having a suitable compost, to be successful in raising and keeping house plants. When they are first potted, it is important that they gradually become accustomed to their changed mode of life. They should be taken up from the ground while there is yet growing weather, carefully pressed into the pot, pruned to diminish the evaporating surface, and shaded a few days till they recover. When the plants are taken indoors, it is best to keep them in a room without a fire, and where they can have plenty of air on mild days. October is a good month for potting most flowers for the winter.

Dust and dryness of the atmosphere are the two greatest troubles of indoor

flower-growing. The first is avoided by covering the plants with a light cloth while the room is being swept, and when it has accumulated it is removed by placing the pots in a sink or washtub, and showering the foliage with water from a pot provided with a fine rose. The second is overcome to a certain extent by keeping water on the furnace or stove which heats the room, if it be warmed by artificial heat. Open fires give but little trouble, while hot air heaters are as unhealthy for plants as for man. Another plan recommended is to place the pots on clean sand kept constantly moist. The sand may be spread to the depth of about two inches in a shallow wooden box, of the size of the window sill upon which the plants usually stand.

A common fault of amateur gardeners is to water the plants too often with too little liquid each time; it is preferable to let the earth become somewhat dry, and then to give it a thorough drenching. Plants coming to bloom need more moisture, and should be brought nearer to the light; to prolong the bloom, it is advantageous to shade the flowers from the hot sun in the middle of the day. Of course, manure is necessary for the cultivation of house plants, but it should not be used in excess, and the above enumerated precautions will be found of equal importance to insure success.

#### ENGLISH IVY.

The use of English ivies for the purpose of decorating living rooms is more extensive every year, and cannot be too highly commended. Being very strong, they will live through any treatment; study their peculiarities, and manifest willingness to gratify them, and they

will grow without stint. Most houses are too hot for them, as indeed they are for their owners. Neither plants nor people should have the temperature over sixty-five degrees of Fahrenheit. Take care not to enfeeble your ivies by excessive watering or undue heat, and you will see they will not seem to mind whether the sun shines on them or not, or in what position or direction you train them. Indeed, so much will they do themselves to make a room charming, that we would rather have an unlimited number of them to draw upon, than anything else in nature or art.

The English ivy, growing over the walls of a building, instead of promoting dampness, as many persons would suppose, is said to be a remedy for it; and it is mentioned as a fact, that in a room where damp had prevailed for a length of time, the affected parts inside had become dry when ivy had grown up to cover the opposite exterior side. The close, overhanging pendant leaves prevent the rain or moisture from penetrating the wall. Beauty and utility in this case go hand in hand.—*The Sanitarian*.

#### PRESSED LEAVES.

A good way to arrange autumn leaves and ferns is to stitch or pin or iron them on with thin mucilage to a strip of lace of suitable width, and with it border lace or muslin window curtains and lambrequins. This confines them so they will not easily be broken, and the light falling through brings out the colors finely, and the whole produces a charming effect. An invalid of our acquaintance decorates her room by twisting the stems of autumn leaves on fine wire as milliners do artificial flowers, twining the sprays about walls, windows, and pictures, like vines.

### THE RED SPIDER.

Among the mites we find many species, some beneficial to man, others noxious. In a list of the former we may mention the locust mite (*Trombidium locastarium*, Riley) which preys upon both the locust and its eggs. It is an important auxiliary in checking the multiplication of the Rocky Mountain locust. Another species (*Uropoda Americana*, Riley) preys upon the Colorado potato beetle, while still another (*Trombidium muscarum*, Riley) infests, in the larva state, the common house fly.

Among the noxious species are the itch mite, the cheese mite, the jigger, or harvest mite, of the more Southern States (*Septus Americanus*, Riley), and the one at present under consideration, the red spider.

A curious fact in the life history of these tiny creatures is that they are born with but six legs, though in the adult state they have eight.

The red spider, which is such a pest to the florist, thoroughly dislikes water. It cannot thrive in a humid atmosphere, nor on plants often drenched with water. On the other hand it multiplies rapidly in a dry air so that some florists consider it a certain evidence that their plants are not receiving sufficient water when the spider appears. Drench the leaves of infested plants often with water in which is a little whale oil soap. See that every leaf is thoroughly moistened, and repeat the sprinkling frequently, according as the weather is hot and dry, and the pest will soon disappear. It is bad on vines and shade trees only in the hot, dry weather of midsummer, and needs most watching then.

Subscribe for THE AQUARIUM now.

BOOK MARK AND REFERENCE TABLE			
	F	R	C
130			6
120		40	50
110			
100		30	40
90			30
80		20	20
70			
60		10	10
50			0
40		0	0
32			
20		10	10
10			20
0		20	30
10			
20			

Copyright by Hugo Mulertt.

COMPARATIVE THERMOMETER SCALES AND INCH AND CENTIMETRE MEASURES.



Now is the time to pay your subscription for *THE AQUARIUM*. This should always be attended to promptly, bearing in mind that this little magazine is published in the interest of a good cause—your recreation.

When regulating the light for your aquarium or for your plants by means of the window shades, you should pay as much attention to this work in dark, rainy weather, for the welfare of your collection, as you do in sunny weather, for the benefit of your carpet. In sunny weather the shades may be down, but in cloudy weather supply all the daylight you possibly can.

At least once every week you should wipe the inside glass of your tank with the wiper or a flat sponge tied to the end of a flat stick. This precaution properly attended to in the early spring will prevent much annoyance later on.

The best of all-glass tanks, although they are "made in Germany," are not as desirable for an aquarium as are the rectangular metal-frame tanks with select sheet or plate glass. The all-glass tanks sold in the American market for aquarium purposes, not having been designed for this purpose, are seldom of entirely clear glass, or without defects of some kind. Entirely faultless tanks are made with polished sides; these are intended for scientific purposes and come very high.

The greatest advantage claimed by some people for these tanks is their being made in one piece, which prevents leaks. So it does. But a well-made metal-frame aquarium never leaks, so then, where is the advantage? If one of these all-glass tanks is injured by accident, the entire tank is gone, while when one glass is injured in a frame tank, the injured part only is lost, and this is easily replaced at small expense.

So we see that the condition which is claimed as their greatest advantage, is really their weakness.

It requires money to publish a paper and the circulation of a paper, of the nature of the *AQUARIUM*, is limited. You should, therefore, assist the publisher as much as you can by securing new subscribers and by renewing your own promptly.

Copies on stiff paper of the comparative thermometer scale and comparative inch and centimetre measure, printed on another page, may be had on application for a two cent stamp.

*THE AQUARIUM* assists you to instruct your children, helps to entertain your friends and supplies to yourself many hours of wholesome recreation. For all this you should be willing to pay as cheerfully as you do for a lecture, concert or theatre ticket, which is comparatively much more expensive.

We are in receipt of many communications, especially postal cards, the signatures of which we are unable to make out. Want of attention towards your communication may be traced to this cause. You should sign your name and address plainly.



### DRYING PLANTS.

Most people have had to regret that specimens of plants and flowers which they find in the woods and fields, and carry home to preserve, in most cases lose their color and beauty in the process.

A Vienna journal says: "We are informed that this inconvenience may be overcome by dipping the plants in a warm mixture of one part hydrochloric acid and six hundred parts alcohol, shaking them to get rid of superfluous fluid, and then laying them in warm blotting paper, which ought to be changed at least once daily. By this means the plants will not only dry quickly, but will also retain their natural color."

ONE OF OUR CUSTOMERS who was traveling in Europe last summer, brought with him on his return some rare treasures for his aquarium. We supplied the tanks in which they are now kept, and the aquatic plants for these, in which lines, he says, we excel any firm in Europe.

The collection which he brought along consists of: Climbing Perch (*Anabas scandens*), Gouramis, a new species of Paradise fish, all native of East India; Siamese Fighting fish, beautiful specimens of Chinese Fringetail Telescope goldfish, several species of Japanese and German goldfish, Brazilian Zebrafish, Mailed and Striped Catfishes from South America.

As will be noticed, nearly all are exotic fish, for which this gentleman expended nearly two thousand dollars.

TO PRODUCE NAMES ON SHELLS.—The Chinese force the pearl mussels (*Anodonta plicata*) of their rivers to produce pearls to order (See article Pearl Culture in last issue of the AQUARIUM). They also introduce small flat figures, representing Buddha, between the shells of these mollusks which these animals press against the inside walls of their shells where they be-

come soon coated with pearl. Shells containing such pictures of Buddha are highly prized among the Chinese.

The Superintendent of the Hamburg (Germany) Aquarium, having heard of this fact, has experimented in this direction with the triton shell (*Triton nodiferus*) of the Mediterranean Sea. He cut out of thinly rolled white metal (tin foil) names and monograms, and pasted these with wax upon the inside of the shell upon a spot which had been wiped dry for the purpose, and as deep inside as the presence of the animal would admit. When after several months these animals had died, the lettering was found completely covered with shell material standing out quite distinctly in relief upon the same spot upon which it had been pasted.

HONOLULU, THE CAPITAL of the Sandwich Islands, is to have an aquarium. Mr. C. R. Bishop of that city has donated to the managers of the Honolulu Museum, of which he is also the founder, the sum of three-quarters of a million dollars (\$750,000) for the construction of a public aquarium, to which a biological marine station shall be attached. Prof. Brigham, who has made a study of the aquariums in Europe, is now making the plans for same. Naturalists and instructors will be induced to come there, and biological students are expected from America and Europe.

A SEED MERCHANT OF DANZIG, GERMANY, had been charged with selling unreliable, stale seeds. He was promptly arrested. He must have felt guilty, and fearing the consequences while awaiting his trial, he committed suicide in his cell by hanging.

THE MAN OWNING the greatest number of dogs in the world is apparently Mr. Gustav Ivanovitch, a "Russian cattle king." To herd his one million and a half of sheep he requires the services of thirty-five thousand shepherd dogs.

LITTLE JOHNNY—Papa, why are fish dumb?

PAPA—Foolish boy; can you speak when under water.



For the small sum of one dollar in advance, which pays for a year's subscription to THE AQUARIUM, you are entitled to ask information on any point regarding the aquarium or the window garden. We offer no other premium to our subscribers than that of putting over 25 years of practical experience in these branches at their disposal. Ask as many questions as you please, but please to enclose postage for reply. All questions are answered by mail, and we publish only such in these columns as are of general interest.

Rev. W. K.—Wood is not the proper material to use in the construction of an aquarium tank; metal is every time the cheapest, neatest and safest. A one and one-half pound box of our waterproof cement will re-set all the glass of your tank, which, you write, measures  $7\frac{1}{2} \times 14 \times 8$  inches high. Directions for using the cement are on the label.

After having the glass re-set, fill the inside corners of the tank with cement, and in this imbed carefully narrow strips of glass, sufficient in width, say one-half or three-quarters of an inch, to touch the glass on both sides. Do this work in a warm room to avoid that the oil, used in mixing the cement, will become thick from the cold.

If this treatment does not stop the leak of your tank, nothing else will, and you had better get a new frame made to fit your glass, using metal this time and following our directions to the minutest detail, as given for the construction of an aquarium tank on pp. 106-108, Vol. III. (April, '94) of THE AQUARIUM.

A. E. S.—The large Two-spined Sticklebacks (*Gasterosteus aculeatus*), which is the most reliable nest-building species for an in-door aquarium, are in season from the end of February until April. Under ordinary circumstances they will not live in fresh water all the year round, the water becoming too warm for them. Twice we succeeded to keep some as late as the month of August, but the sultry, uncomfortable weather, characteristic of that month in our location, killed them.

Miss N. — It is very likely that the stomachs of your telescope fish had been disarranged by improper feeding.

The one yet alive seems to indicate by his action that your aquarium is not sufficiently supplied with oxygen for him; he is perhaps a larger fish than your others. In that case you should regularly and carefully remove all the sediment from the bottom of your tank by aid of a siphon, and also add a good pinch of table salt to the water.

Our climate is not exactly unfavorable for imported Japanese fish, but all imported stock has to get used to it by degrees. It is a fact that the majority of them die before a year is up. The best goldfish for an aquarium are those that have been bred in this country from imported stock.

Mrs. L. K.—It is not absolutely necessary to have a sunny window to be successful in growing house plants. A northern window is very good for a great many kinds of plants, but it is absolutely necessary that the plants are so placed that they can see the sky. If this view is interfered with by a porch, or some other kind of an extension over or before the window, window gardening will not prove a success.

Mr. F. W.—Yes, direct sunlight is good for the development of fishes and plants, and we recommend it when the aim is to breed or raise fish, but in an aquarium we simply wish to keep the inmates in a healthy condition for display or study. These two purposes have a parallel in a propagating house and a conservatory.

Each of these is intended for an entirely different purpose and is run on entirely different principles.



